Navy Personnel Research and Development Center
San Diego, California 92152-6800 TN-91-7 March 1991

AD-A234 874

Officer Career Development: Factors that Predict Subspecialty Decisions and Proven-subspecialty Status

Gerry L. Wilcove
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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATE COVERED
	March 1991	Final--Oct 1988-Sep 1989

4. TITLE AND SUBTITLE
Officer Career Development: Factors that Predict Subspecialty Decisions and Proven-subspecialty Status

5. FUNDING NUMBERS
Program Element 0602233N
Work Unit RM33M20.06

6. AUTHOR(S)
Gerry L. Wilcove, Robert F. Morrison

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Navy Personnel Research and Development Center
San Diego, California 92152-6800

8. PERFORMING ORGANIZATION REPORT NUMBER
NPRDC-TN-91-7

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Office of Chief of Naval Research (ONT-222)
800 N. Quincy Street
Arlington, VA 22217-5000

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The research's goal was to help the Navy more fully meet its need for technical and acquisition-management specialists at intermediate and senior grade levels. Toward that end, the research attempted to identify those factors that would predict who would become a proven subspecialist in the targeted grade levels and who would remain totally committed to a warfare specialty. The researchers believed that proven-subspecialty status is the culmination of the following: (1) the perceived value of subspecialties for career advancement influences the officer's decision on whether to obtain a proven subspecialty, (2) the decision to obtain a proven subspecialty requires a decision on whether to obtain a postgraduate degree, and (3) since attendance at postgraduate school is voluntary, the decision to pursue that goal should be a good predictor of proven subspecialty status. Three FY82 questionnaire-determined factors, used in combination, produced the best predictions of proven subspecialty status in FY86/87: the proven-subspecialty and postgraduate-degree decisions, and operational mission. These predictors produced a fairly high correlation of .49. Recommendations were offered on how to motivate officers to assume more responsibility for the development of subspecialty expertise.

14. SUBJECT TERMS
Careers, officers, career planning, subspecialties, specialization, dual-career ladders, experts, career path

15. NUMBER OF PAGES
49

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNLIMITED

FOREWORD

This effort was conducted within program element 0602233N (Mission Support Technology), project RM33M20 (Manpower and Personnel Technology), Task RM33M20.06 (Career and Occupational Design). The purpose of the work unit was to develop explanatory models of unrestricted line (URL) officer career decisions. These models could then be used to assess the impact of existing and proposed URL career policies and practices upon officers' career decisions and activities.

This report was completed under the sponsorship of the Office of Chief of Naval Research (ONT 222). Results are presented on the factors that predicted officers' subspecialty and subspecialty-related decisions, as well as their proven-subspecialty status at the lieutenant commander (LCDR)/commander (CDR) levels.

A paper summarizing the findings was presented by the junior author at the Meeting of the American Psychological Association held in New Orleans during August 1989. A version of the present report has been published in *Military Psychology*.

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SUMMARY

Problem

The Navy needs to fill its technical and materiel/weapons acquisition billets with quality, committed individuals at intermediate and senior grade levels (i.e., with individuals who excel in specialized areas and who are committed to those areas for the duration of their naval careers). The optimal way to meet this need is to groom individuals for proven subspecialty status in specific areas, a process that should include the active involvement of officers themselves. The Navy can assist and encourage officer involvement, but, to be effective, must understand the factors that motivate and influence officer subspecialty decisions. However, little, if any, research has been conducted to provide the Navy with this needed information.

Objective

The goal of the research was to help the Navy more fully meet its need for technical and acquisition management specialists at intermediate and senior grade levels. Toward that end, the research attempted to identify those factors that would predict who would become a proven subspecialist in a technical or acquisition management area and who would remain totally committed to a warfare specialty.

Procedure

The present study was part of a wide ranging research program examining officers' career development activities and their perceptions of the Navy's career management system. Three unrestricted line communities formed the focus of the research program, two of which were of interest in the present study: surface and aviation warfare officers. The sample was composed of 1,329 officers who had been commissioned between 1969 and 1976 and were lieutenants without proven subspecialties when the study was initiated in FY82. By FY87, these officers had become lieutenant commanders (LCDRs) or commanders (CDRs) and had served in the shore assignments necessary to become proven subspecialists if they so desired. Of the 1,329 officers in the sample, 648 (49%) had become proven subspecialists and 681 (51%) had chosen to commit themselves totally to their warfare specialties. The sample was found to be representative of the population on three of four statistical measures.

The researchers assumed that obtaining a proven subspecialty represented a culmination of the following: (1) the perceived value of subspecialties for career advancement influences the officer's decision on whether to pursue a proven subspecialty, (2) the decision to pursue a proven subspecialty requires a decision on whether to request postgraduate school, and (3) since attendance at postgraduate school is voluntary, the decision to pursue that goal should be a good predictor of proven subspecialty status.

The researchers also assumed that background and attitudinal factors would influence the officers' views on the career benefits of subspecialties and their proven-subspecialty decisions. These factors include background variables such as undergraduate major, family considerations, officers' career decision processes, their career satisfaction, and their attitudes toward rotation.

Researchers believed that the study's findings might depend on the mission of the officer's community and the opportunity that community membership accords officers for obtaining a proven subspecialty. Officers were thus classified into groups. For example, surface warfare officers formed one classification group, because their missions contrasted with those of aviators and because they had the greatest opportunity to obtain a proven subspecialty. Aviators were grouped into three classification groups, an example being the electronics warfare/intelligence (VP) community, which had a fairly good opportunity to become proven subspecialists.

Questionnaire data, supplemented by background data from the Officer Personnel File (OPF), were collected in FY82 and served as predictors. The OPF was used in FY87 to determine if officers had become proven subspecialists or had remained totally committed to their warfare specialties. The primary goal of the analysis was to predict whether or not an individual became a proven subspecialist. It was recognized that further research would be needed to determine if the results of the present study could be replicated on additional samples.

Findings

1. Three factors, used in combination, produced the best prediction of proven subspecialty status: the proven-subspecialty and postgraduate school decisions, plus the variable reflecting mission and the opportunity for developing proven subspecialties. These predictors produced a fairly high correlation of .49.

2. Both the proven subspecialty and postgraduate school decisions were predicted fairly well, with correlations of .51 and .44, respectively, being obtained. The decision to obtain a proven subspecialty was predicted by a favorable attitude toward geographic changes, an unfavorable attitude toward job changes, and a belief that subspecialties benefitted one's naval and post-naval careers. Positive attitudes toward the career benefits of subspecialties also predicted the decision to request postgraduate school. Other predictors of this decision included dissatisfaction with previous assignments, a reliance on detailers and *Perspective* for career planning information, and a disregard for public media as sources of information for career decisions.

3. Researchers revised their assumptions regarding: (a) the sequence of events that lead to a proven subspecialty and (b) the role played by various factors in the officer's decision-making process.

4. Analyses of the career experiences of the officer sample showed that:

a. Sixty-one percent of the individuals who had obtained Navy-sponsored postgraduate degrees did not have the opportunity to apply this education in a follow-on assignment.

b. Seventy-five percent of the individuals who had become eligible for proven subspecialty consideration had reached this point without obtaining a postgraduate degree (i.e., they had served in two subspecialty tours).

Conclusions

1. Questionnaire items did a respectable job, when considered in combination, of predicting who would obtain a proven subspecialty and who would concentrate solely on a warfare specialty.

2. Respectable predictions suggested that for some officers their career decisions were instrumental in their becoming established in the career track of their choice.

3. The fact that predictions were not more accurate might have reflected two factors:

a. A large percentage of officers with Navy-sponsored postgraduate degrees did not obtain the opportunity to apply their education in a payback tour.

b. Proven subspecialty status was primarily the result of the Navy's practice of assigning officers to two consecutive tours in the same subspecialty area, rather than officers taking responsibility for initiating and guiding their own subspecialty development.

Recommendations

1. To assist proactive officers who desire a proven subspecialty, the Navy should:

a. Clearly structure its subspecialty policies and paths.

b. Ensure through its policies and practices that proven subspecialty development is rewarded.

c. Communicate to officer personnel, and administer consistently, the system of subspecialty opportunities and rewards.

2. To increase the percentage of payback tours for officers with Navy-sponsored postgraduate degrees, the Navy could:

a. Utilize a larger assignment window to match personnel resources with billet vacancies.

b. Place all aspects of its subspecialty program under the same organizational structure and leadership.

c. Commit officers to specific payback tours if they have been assigned to a postgraduate degree program.

3. To enhance the Navy's development of subspecialty expertise and increase the officer's involvement, the Navy should familiarize officers during their initial assignments with the subspecialty path and its requirements.

4. To aid in the development of proven subspecialists, the Navy should modify its procedures so that subspecialty career requirements are considered in the initial assignment of officers to their billets.

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INTRODUCTION

Background

Naval Research

The Navy Personnel Research and Development Center (NAVPERSRANDCEN) maintained a research program from 1981 to 1989 that was devoted to a wide range of career development and career management issues. This program focused on surface warfare officers (SWOs), aviation warfare officers (AWOs), and general unrestricted line (GenURL) officers (Morrison & Cook, 1985). In 1981/1982, over 9,000 officers commissioned between 1961 and 1980 completed questionnaires, and in 1986/1987, over 12,000 officers, commissioned between 1961 and 1985, completed follow-up or first-time questionnaires. At both points in time, data from the officers' personnel records were added to the questionnaire responses. The thrust of the research was to identify the correlates and antecedents of various career decisions and behaviors, such as becoming a proven subspecialist.

Naval Subspecialty Development

In any organization, there are two types of leadership positions: those directly connected with the organization's mission, and those providing support to the line functions. In the Navy, the former positions are filled by unrestricted line (URL) officers and the latter positions are filled by URL officers, restricted line officers, and staff officers. Support activities tend to drift away from line functions and become ends in themselves unless appropriate mechanisms are installed (Etzioni, 1961). One way the Navy focuses support activities on line requirements is to transfer URL personnel from warfare (line) roles to support roles, and back again--the normal sea-shore rotation. An example of a programmatic approach is to assign URL officers with subspecialties to technical/professional and weapons/materiel acquisition billets when they come ashore. This subspecialty program was the focus of the present research.

The Navy's subspecialty development process operates as follows. After initial training, junior officers spend 3 years on sea duty learning their warfare roles. Some of their first sea duty assignments, such as antisubmarine warfare, have been designated as subspecialty billets. These officers obtain their subspecialties based on their experience. However, others must wait to become subspecialists until their first shore assignments, when they can acquire a postgraduate degree in a technical or managerial curriculum or acquire extensive training (e.g., test pilot school).[1] Both groups of officers attain the status of *proven* subspecialist when second, relevant-experience assignments are completed, performance is acceptable, and promotion at 10 years of service to the grade of lieutenant commander (LCDR) or higher is attained. The URL proven subspecialist should be skilled in the technology and applications unique to his subspecialty, and, in addition, be ready to develop the skills necessary to manage technical, administrative, or acquisition support functions. Because of the constant movement between warfare specialty and subspecialty assignments, it is appropriate to characterize the process as dual-career development.

[1]For those receiving a Navy-sponsored graduate education, Department of Defense policy requires the officer to complete, within two assignments after graduation, a payback assignment that applies the education.

Problem

The Navy needs to fill its technical and materiel/weapons acquisition billets with quality, committed individuals at intermediate and senior grade levels (i.e., with individuals who excel in specialized areas and who are committed to these areas for the duration of their naval careers). The optimal way to meet this need is to groom individuals for proven subspecialty status in specific areas, a process that should involve the active participation of officers themselves. Active participation means that officers must be motivated enough to consider a subspecialty career. It also means that officers must engage in a decision-making process that realistically appraises their interests, abilities, and goals, as well as the Navy's long-term subspecialty requirements and opportunities. The Navy can assist officers in all of these areas, but, to be effective, must understand the factors that motivate and influence officer subspecialty decisions. However, little, if any, research has been conducted to provide the Navy with this needed information.

Purpose

The goal of the present effort was to help the Navy more fully meet its need for technical and acquisition management specialists at intermediate and senior grade levels (LCDR through captain (CAPT)). Toward that end, the research attempted to identify those factors that would predict who would become a proven subspecialist in a technical or acquisition management field and who would remain totally committed to a warfare specialty.

Models

Two models were developed. The first model (shown in Figure 1) places subspecialty-related decisions within the context of other major career decisions the officer is required to make. The second model (shown in Figure 2) concentrates exclusively on subspecialty-related decisions.

Four career tracks are presented in the first model: Warrior, Indeterminate (temporary status), Restricted Line/Staff/Materiel-Professional (M-P), and Warrior-technical (Warrior-tech). The Warrior Track refers to individuals who decide to concentrate totally on their warfare specialty; the Indeterminate Track, to individuals who decide to obtain a postgraduate degree to further their careers, but who are undecided about whether to pursue a proven subspecialty; the Restricted Line/ Staff/MP Track, to individuals who decide to leave their URL community and pursue a full-time nonwarfare occupation; and, the Warrior-tech Track, to individuals who remain warfare officers, but also decide to pursue a proven subspecialty.

Figure 1 presents the progression of officers along the four career tracks. That is, individuals make a decision to stay in the Navy or leave (Box 1). If they stay, then they decide whether or not to obtain a new occupational skill (Box 2), which ultimately means switching to the Restricted Line/Staff/MP Track (Box 8) or becoming a proven subspecialist as part of the Warrior-tech Track (Box 13).

Some officers decide not to obtain a new occupational skill and decide not to obtain a postgraduate degree (Box 3). These officers are pursuing the Warrior Track (Box 4). Other officers, however, decide to obtain a postgraduate degree, because they believe it will increase their chances for promotion (Box 3). However, since they are unwilling to commit to becoming a proven subspecialist, at least at that time, they are classified as being in the Indeterminate Track (Box 5).

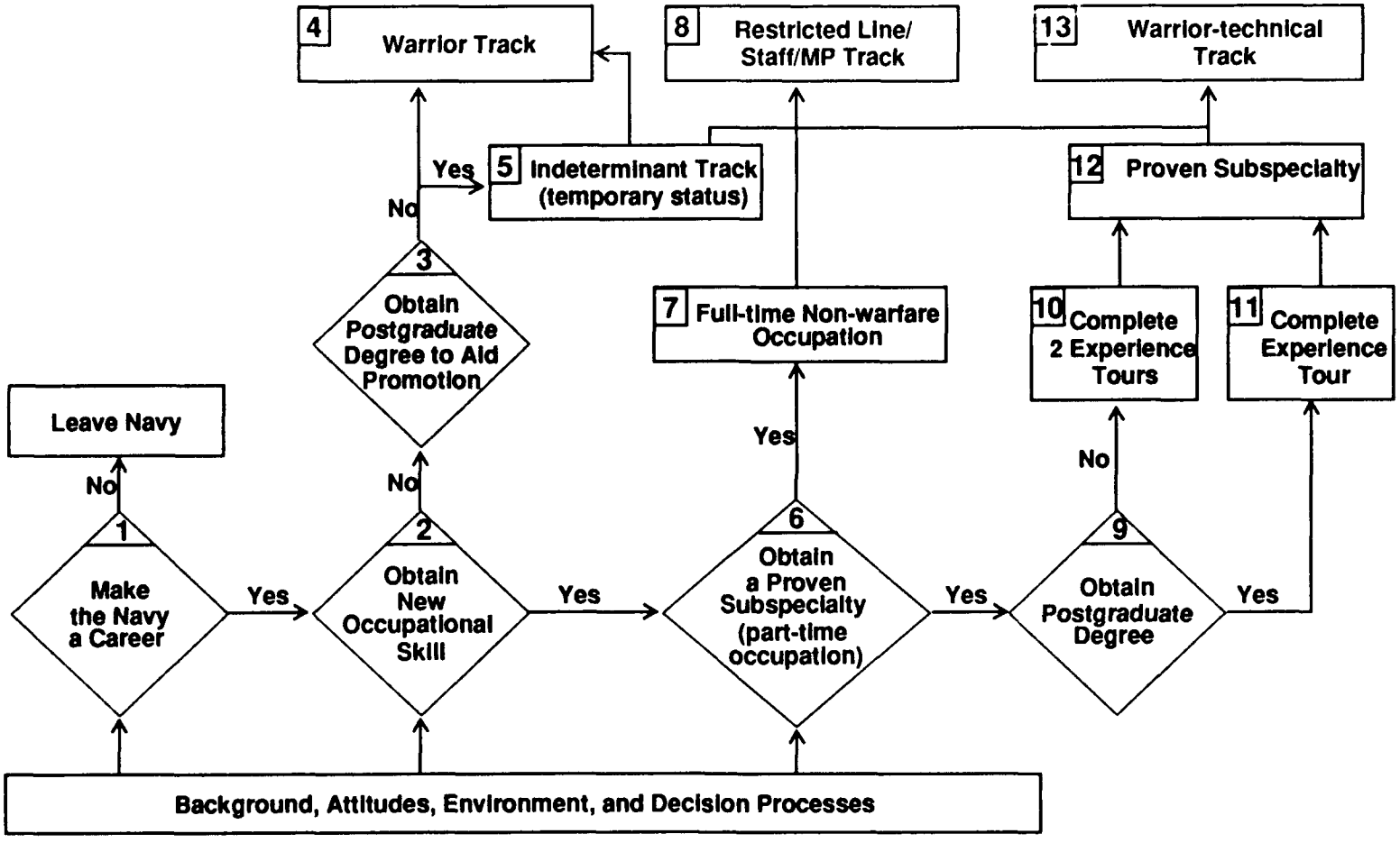

Figure 1. Decision paths towards a Warrior Track, Indeterminate Track (temporary status), Restricted Line/Staff/Mi...iel-Professional (MP) Track, and Warrior-technical Track.

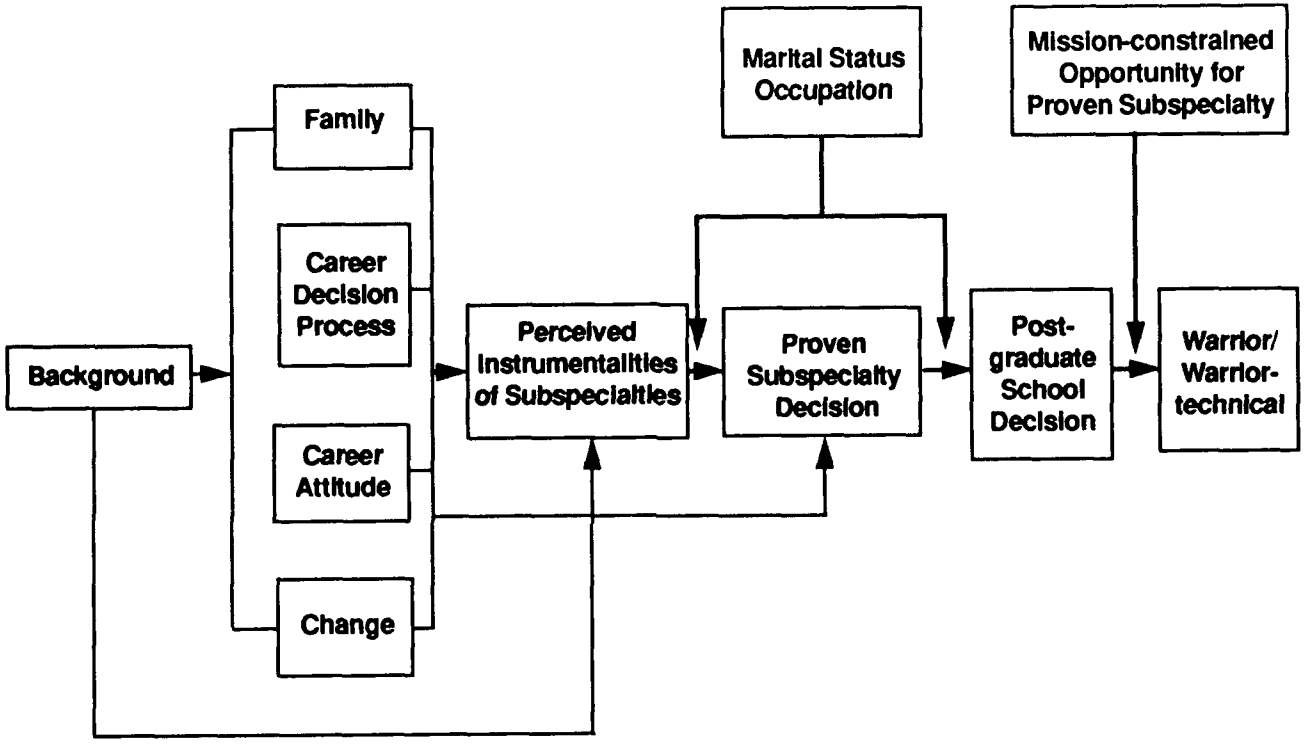

Figure 2. Factors believed to influence subspecialty decisions and progression towards Warrior and Warrior-technical career tracks.

If an officer decides to obtain a new occupational skill (Box 3), it helps to pursue a proven subspecialty (Box 6) if the officer wants to become a member of the Restricted Line/Staff/MP Track and is imperative if they want to pursue the Warrior-tech Track (Box 13). An officer can obtain a proven subspecialty (Box 12) in one of two ways: by obtaining a postgraduate degree (Box 9) and a related experience tour (Box 11) or by serving in two subspecialty-related experience tours (Box 10). Either way, the individual is eligible for the Warrior-tech Track or considered to be a prime candidate for the Restricted Line/Staff/MP Track.

Figure 2 focuses only on the two career tracks (Warrior and Warrior-tech) that were of interest in the present research. Generally speaking, background factors were hypothesized to predict a variety of other factors, such as the influence of the family on career decisions, the career decision process itself, and the officer's attitudes toward change. These factors were, in turn, seen as contributors to the "perceived instrumentalities of subspecialties" (i.e., the officer's belief regarding the usefulness of subspecialties for obtaining promotions and other valuable outcomes). The instrumental value of a subspecialty was seen as the key to determining whether or not an individual decided to obtain a proven subspecialty. If an individual decided to obtain a proven subspecialty, it was expected that they would either obtain a postgraduate degree, and subsequently become a Warrior-tech, or attain this status through experience tours.

Figure 2 also presents "Marital Status" and "Occupation" as being factors in whether or not an officer's perceptions of the instrumental value of subspecialties would predict his proven subspecialty decision. "Occupation" refers to the specific URL community of an officer (e.g., aviation warfare). Figure 2 also presents "Mission-constrained Opportunity for Proven Subspecialty" as being a factor in whether the decision to request postgraduate school actually leads to a proven subspecialty. In short, the mission of an individual's community has a direct impact on the amount of time available to that individual for pursuing a proven subspecialty.

METHOD

Sample

The sample consisted of 1,329 individuals, 681 of whom (51%) were in the Warrior Track in FY87 and 648 of whom (49%) were in the Warrior-tech Track. The research task was to try to predict track membership, using questionnaire and Officer Personnel File (OPF) data collected 5 years previously (FY82). The FY87 sample was composed of 377 SWOs and 952 AWOs, 71 percent of whom were LCDRs and 29 percent of whom were commanders (CDRs). All had been lieutenants (LTs) when the research was initiated and had been commissioned between 1969 and 1976.

Appendix B describes in detail the strategies used to select the samples and the justification for combining SWOs and AWOs into a single sample rather than analyzing them separately.

In *FY82*, the 1,329 individuals in the sample had been either Warriors (i.e., had no subspecialties) or subspecialists. A total of 1,143 had been Warriors, while the population contained 3,805 Warriors--a 30 percent sample. Of the 1,329, 186 had been subspecialists, while the population contained 442--a 42 percent sample. Both percentages, on this first measure of representativeness, suggested that sample sizes were large enough to allow researchers to

generalize study results to the overall population.[2] In addition, the ratios of subspecialists to Warriors in the population and sample were very similar (.12 and .16, respectively), a second indication of the representativeness of the sample at Time1 (T1).

In FY87, there were 2,987 Warriors in the population, 23 percent of whom (n = 680) were included in the sample. There were 1,260 Warrior-techs in the FY87 population, 51 percent of whom were included in the sample (n = 649). These percentages on this third measure of representativeness suggested, once again, that sample sizes were large enough to allow researchers to generalize study results to the overall population.[3] On a fourth measure of representativeness, however it was found that the percentages of Warriors and Warrior-techs in the population (70% versus 30%) were significantly different ($p < .01$) than sample percentages (51% versus 49%). These results suggested that some caution should be exercised in generalizing study findings to the population.

Four URL officer subsamples were examined in the research at times, although, as mentioned, most analyses treated the officers as a single sample. The subsamples were: (1) SWOs (n = 377); (2) aviators in fighter, attack, cargo helicopter, and mine warfare helicopter subcommunities (n = 358) ("TACPLUS"); (3) aviators in carrier-based and helicopter antisubmarine warfare (ASW) and electronics warfare (EW) subcommunities (n = 359); and (4) aviators in the patrol ASW (VP) subcommunity (n = 235).

The four subsamples were formed based on the opportunity that their missions permitted for pursuing proven subspecialties (i.e., some missions, and their associated career paths, permitted more time than others to develop specialized skills). SWOs had the greatest opportunity, with .74 of the sample having had obtained a proven subspecialty by the LCDR level. The TACPLUS group had the least, .12, while the VP and ASW/EW groups had a .57 and .53 opportunity, respectively. These last two groups could not be combined because the ratio of education-based proven subspecialties to experienced-based proven subspecialties was significantly larger for the VP group than for the ASW/EW group.

Outcome Variables

The primary outcome to be predicted in the research was the officer's career track: Warrior or Warrior-tech. Not all individuals who had proven subspecialties were included in the Warrior-tech group. Only technical, weapons and materiel acquisition, and financial management subspecialties were included in the research, because the greatest need for skilled officers exists in these areas. Many of these subspecialties, for example, provide the skilled personnel necessary for the MP Program, such as acquisition management, weapons systems engineering, computer technology,

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[2]Sampling statistics indicated that the Time1 sample was representative of the population with respect to subspecialty status (had obtained a subspecialty versus had not) at the 99 percent level of confidence (Cochran, 1977, pp. 77-78). This result suggested that study results could be generalized to the population.

[3]Sampling statistics indicated that the Time2 sample was representative of the population with respect to proven subspecialty status (had obtained a proven subspecialty versus had not) at the 99 percent level of confidence (Cochran, 1977, pp. 77-78). This result suggested that study results could be generalized to the population.

and electronics warfare. In contrast, subspecialties such as English, history, transportation management, educational and training management, and operational logistics were excluded from the research.

Appendix A describes the conceptual development of the outcome variable and the procedures used to classify individuals into the Warrior and Warrior-tech career tracks.

Two secondary outcome variables (see Figure 2) were officers' postgraduate school decision and their proven subspecialty decision.

Predictors

Twenty-two predictors were used in the study. These predictors were taken from NAVPERSRANDCEN's database, which was composed of questionnaire data and information extracted from the OPF. The career development research that established the database is described in Morrison and Cook (1985) and Wilcove and Wilson (in review). The database is described in Burch, Bruce, and Russell (the longitudinal sample--FY82) (in review), Burch, Bruce, and Russell (the longitudinal sample, FY86/FY87, in review), and Bruce, Burch, and Russell (the cross-sectional sample--FY86/FY87, in review).

Predictors were at times one bit of data, such as a questionnaire item, or a single field off the OPF, such as source of commission. Predictors were also "scales," a total score obtained by adding the numeric response codes from several related questionnaire items. For example, consider the "Headquarters" scale. Here, officers were asked to indicate their level of usage of *Perspective* and detailers as sources of career planning information. Their answers could range from 1 (very low usage) to 7 (very high usage). Adding an officer's responses together for these two items produced a scale score, which served as a predictor.

The 22 variables are grouped into general classes and presented in the left-hand position of Table 1. Variable classes, such as "Background," "Family," and "Career Decision Process" were presented previously in Figure 2, which portrays the model guiding the research. Note that "Education Major" (which was taken from the OPF) is listed under "Background" in Table 1. One can see in the right half of the table that majors were classified as non-technical or technical. Similarly, under "Family," one finds "My spouse supports my naval career," an item that was taken from a questionnaire. The right half of the table for "Family" shows that officers could select their response from a 7-point continuum that varied from strongly disagree (a value of 1) to strongly agree (a value of 7).

Analysis

The technique used to analyze data in the research was hierarchical inclusion multiple regression. Appendix C contains the technical presentation of the results obtained from applying this technique.

Table 1

Predictors: Areas and Levels

Areas	Levels
Background	
Education major.	Non-technical, technical.
Source of commission.	Regular, reserve.
Family	
My spouse supports my naval career.	Strongly disagree to strongly agree. 7-point continuum.
Is your spouse employed in a non-traditional job, a traditional job, or as a homemaker?	One choice was selected.
What is the impact of your present job on your ability to be with family and friends?	Very negative to very positive, 7-point continuum.
How does family stability in the Navy compare with a civilian career?	*Civilian substantially better* to Navy substantially better, 7-point continuum.
Career Decision Process	
Officers need a special career counseling system.	Strongly agree to strongly disagree, 7-point continuum.
Information sources.	All below sources: very low usage to very high usage, 7-point continuum.
Headquarters (a scale composed of:)	
(*Perspective.*)	
(Detailers.)	
Peers	
Command (a scale composed of:)	
(Commanding officer.)	
(Executive officer.)	
(Department head.)	
Network (a scale composed of:)	
(Other senior officers within community.)	
(Senior officers outside community.)	

Table 1 (Continued)

Areas	Levels
Publications (a scale composed of:) (*Navy Times*.) (Public Media.)	
Career Attitude	
Career satisfaction (a scale composed, for example, of:)	
(I thoroughly enjoy my career.)	(Strongly agree to strongly disagree, 7-point continuum.)
(I feel very good about my career.)	(Strongly agree to strongly disagree, 7-point continuum.)
Your evaluation of assignments received in your career.	Very negative to very positive, 7-point continuum.
I feel the billets I have received reflected my experience and past performance.	Definitely did not to definitely did, 7-point continuum.
Change	
Your evaluation of changing assignments every 2-3 years.	Very negative to very positive, 7-point continuum.
Your evaluation of geographic relocation with each assignment change.	Very negative to very positive, 7-point continuum.
Perceived Instrumentalities of Subspecialties	
A subspecialty is important for my career.	Strongly disagree to strongly agree, 7-point continuum.
A subspecialty is important for my post-naval career.	Strongly disagree to strongly agree, 7-point continuum.
A postgraduate degree will help my chances for promotion.	Strongly disagree to strongly agree, 7-point continuum.
Career Decisions	
I have decided to obtain a proven subspecialty.	Yes, undecided, no.
I have decided to request postgraduate school.	Yes, undecided, no.

HYPOTHESES AND RESULTS

Original Model

Various hypotheses were generated that were consistent with the model shown in Figure 2. Hypotheses were generated to predict whether or not an individual would become a member of the Warrior Track or the Warrior-tech Track. Hypotheses were also generated in an attempt to predict officers' postgraduate degree decisions (i.e., if they should request postgraduate school) and their proven subspecialty decisions (i.e., if they should obtain a proven subspecialty).

In many cases, the hypotheses were unsupported by subsequent data analyses. However, it is important to note that researchers were still able to predict career track and officers' postgraduate school and proven-subspecialty decisions fairly well, because of those hypotheses that were supported and some new hypotheses that were suggested by the data.

First, the original hypotheses will be presented and whether or not they were supported. Secondly, new hypotheses will be presented that were supported by the data. Thirdly, a revised model will be presented.

The original hypotheses are grouped into areas. "Career Decisions" focuses on the prediction of career track and the postgraduate degree decision. The remaining areas, such as "Perceived Instrumentalities of Subspecialties" and "Family" focus on the prediction of the proven subspecialty decision.

1. **Career Decisions**

It was predicted that:

a. Individuals deciding to request postgraduate school would be more likely to obtain a proven subspecialty (i.e., become a member of the Warrior-tech Track) (*Supported*), but:

i. The accuracy of this prediction would vary by community, because community missions provide varying opportunities for obtaining proven subspecialties (*Unsupported*).

b. Individuals deciding to obtain a proven subspecialty would be more likely to decide to request a postgraduate school (*Supported*), but:

i. The accuracy of this prediction would be greater for pilots than for SWOs and naval flight officers (NFOs), because pilots could directly transfer their skills to the civilian market (*Supported*).

2. **Perceived Instrumentalities of Subspecialties**

It was predicted that officers who believe that:

a. A subspecialty will help their naval careers are more likely to decide to obtain a proven subspecialty (*Supported*).

b. A subspecialty will help their post-naval careers are more likely to decide to obtain a proven subspecialty (*Supported).*

c. A postgraduate degree will enhance their opportunities for promotion are more likely to decide to obtain a proven subspecialty (*Unsupported).*

It was also predicted that:

d. Hypotheses 2a, 2b, and 2c would be less true for married officers, because proven subspecialists are required to relocate frequently (*Unsupported),* and less true for pilots and NFOs because of restricted opportunities to obtain proven subspecialties (*Supported for NFOs only).*

3. **Family** (married officers only)

It was predicted that officers:

a. Who describe their spouses as supportive of their (seagoing) naval careers are less likely to decide to obtain a proven subspecialty (*Unsupported).*

b. Who more positively than others assess separations from family and the impact of such separations on family stability are less likely to decide to obtain a proven subspecialty, because traditionally oriented women are more likely to accept the traditional, mainstream careers of their husbands (*Unsupported*).

c. Whose wives have traditional female occupations are less likely to decide to obtain a proven subspecialty than officers whose spouses have nontraditional occupations, because traditionally-oriented women are more likely to accept the traditional, mainstrain careers of their husbands (*Unsupported).*

4. **Career Decision Process**

It was predicted that officers who:

a. Desire a special career counseling system are more likely to decide to obtain a proven subspecialty (i.e., they are dissatisfied with their mainstream naval careers and are looking for alternatives) (*Unsupported).*

b. Frequently use headquarters, public media, and network sources of career information are more likely to decide to obtain a proven subspecialty (i.e., because these sources are more likely to accept and/or disseminate information on alternative careers than would mainstream sources such as commanding officers and peers) (*Unsupported).*

c. Infrequently use command and peer sources of career information are more likely to decide to obtain a proven subspecialty (*Unsupported*).

d. Infrequently interact with senior officers or use them as career role models are more likely to decide to obtain a proven subspecialty (*Unsupported).*

e. Receive little counseling on their community's career system and ample counseling on Navy opportunities outside of their community are more likely to decide to obtain a proven subspecialty (*Unsupported).*

f. Receive little counseling on Navy norms and values are more likely to decide to obtain a proven subspecialty (*Unsupported).*

5. **Career Attitudes**

It was predicted that officers who:

a. Are dissatisfied with their careers/the assignments they received will be more likely to decide to obtain a proven subspecialty (*Unsupported).*

b. Believe that their previous billets have not reflected their experience and performance are more likely to decide to obtain a proven subspecialty (*Unsupported).*

6. **Change**

It was predicted that officers who:

a. Have a positive attitude toward changing jobs would be more likely to decide to obtain a proven subspecialty (those in the Warrior Track may be able to homestead for their operational tours) (*Unsupported).*

b. Have a positive attitude toward relocation would be more likely to decide to obtain a proven subspecialty (*Supported).*

7. **Background**

It was predicted that officers who:

a. Have technical bachelor degrees would be more likely to decide to obtain a proven subspecialty than officers with a nontechnical degree (*Unsupported).*

b. Obtained commissions that permitted them to enter the regular Navy would be more likely to decide to obtain a proven subspecialty than officers whose commissions permitted them to enter the reserve Navy. The rationale here was that regular sources of commissioning lead to a greater number of technical degrees than do reserve sources of commissioning (*Unsupported).*

Revised Model

In addition to the original hypotheses, findings revealed and *supported* a range of other hypotheses:

1. If one knows the officer's mission/community, then one can predict the probability of his or her becoming part of the Warrior or Warrior-tech career track (Hypothesis *A*).

2. If one knows both the individual's proven subspecialty decision and his/her postgraduate school decision, then one can predict, with a fair degree of success, which direction his/her career will go (Warrior or Warrior-tech) (Hypothesis *B*).

Previously (see Figure 2), only the postgraduate school decision was believed to be a direct predictor of career track.

3. If one knows the individual's perceptions of the instrumentality of subspecialties, then one can predict, with some degree of success, both the proven subspecialty and postgraduate degree decisions (Hypothesis *C*).

Previously, instrumentality was seen only as a predictor of the proven subspecialty decision.

4. Several other hypotheses emerged, all of them related to the prediction of the postgraduate school decision. Specifically, it was found that officers were more likely to decide to request postgraduate school if they were not an NFO, they were dissatisfied with the assignments they had received in the past, and they used "headquarters" (detailers and *Perspective*) as a source of career information, while eschewing public information sources. Previously (see Figure 2), only the proven subspecialty decision was hypothesized to predict the postgraduate school decision.

Figure 3 presents the revised model. Hypothesis A is shown by the arrows extending down from "Organizational Mission" to the "Warrior/Warrior-tech" career tracks. Hypothesis B is shown by the arrows extending from the two career decisions to the career track box. Hypothesis C is shown by the arrow extending from the far left (see "Instrumentality") to "Proven Subspecialty Decision." The predictors of the postgraduate school decision, such as occupational status (NFO or not), are indicated by arrows in the bottom left portion of the figure.

As shown in Figure 3, a correlation of .49 was obtained between career track and its predictors, a correlation of .51 between the proven-subspecialty decision and its predictors, and a correlation of .44 between the postgraduate school decision and its predictors.

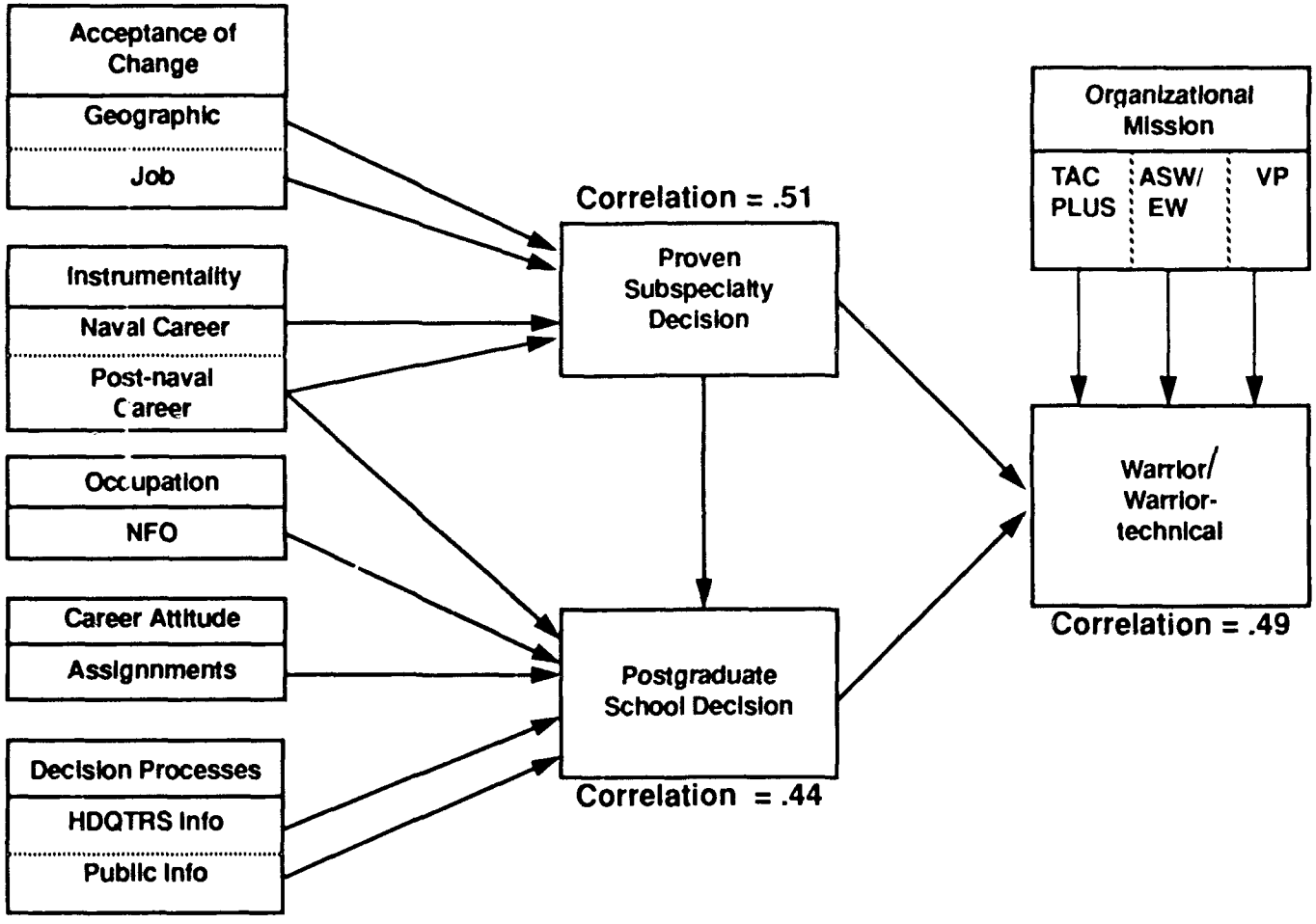

Figure 3. Revised model of factors predicting Warrior and Warrior-technical career tracks.

DISCUSSION

Prediction-attenuating Factors

As a result of the original hypotheses that were supported and the revisions made in the model, significant correlations were obtained for all of the outcomes of interest: career track status (correlation of .49), the proven subspecialty decision (.51), and the postgraduate school decision (.44). However, the revisions to the model must be verified in a future "replication" study.

Although obtained correlations were significant, a weak assumption may have prevented them from being higher. That is, it had been assumed that officers largely control their own fates. However, it was learned that the Navy sometimes uses an ad hoc process in selecting officers as proven subspecialists, especially if they have acquired their subspecialties through experience tours (75% of the study's sample) rather than through postgraduate school. Thus, the accuracy of predictions might suffer, because individuals who indicated on their questionnaires that they were not going to pursue a proven subspecialty might end up with one anyway. In addition, it was found that only 39 percent of the officers in the current study who had obtained Navy-sponsored postgraduate degrees served in a payback tour. Again, the accuracy of predictions might suffer, because individuals who indicated on their questionnaires that they were going to request postgraduate school might not receive the opportunity to apply that education upon graduation.

Since predictions in the present study were predicated on the assumption that officers controlled their own fates, a new outcome measure was constructed. This measure took into consideration the degree to which individuals were assumed to have taken responsibility for developing their own careers. Specifically, proven subspecialists who had attended postgraduate school (education-based Warrior-techs) were assumed to have exercised the most control over developing their careers, since postgraduate school attendance requires the individual's initiative. In contrast, it was assumed that most Warriors were following the norm without much active consideration for alternative naval careers. The group that had obtained proven subspecialty status through experience tours (experienced-based Warrior-techs) was assumed to be composed of some individuals who took the initiative and some who had passively accepted (or were unaware of) what the Navy had given them. In short, this group was perceived to be somewhere between the other two groups on the issue of volition. When the analysis was rerun using the new outcome measure, it was found that this measure could be predicted significantly better than the original measure (Warrior vs. Warrior-tech). Appendix D amplifies the results.

Instrumentality, Change, and Family Factors

Analyses showed that a strong relationship existed between an officer's decision to obtain a proven subspecialty and his perception that a subspecialty would contribute to his career (Hypothesis 2a). The Navy needs to maintain and fulfill this perception in order to meet its human resource requirements for specialized skills at intermediate and senior grade levels.

As expected, the analyses demonstrated that the officer who decides to obtain a proven subspecialty has a favorable attitude toward frequent geographic relocations (Hypothesis 6b). Most positions requiring a proven subspecialist are located in Washington, DC. Thus, the proven subspecialist would have to relocate to Washington after each operational tour. In contrast, officers

concentrating solely on their warfare specialty could possibly homestead by serving their shore and sea assignments in a major port such as San Diego or Norfolk.

Family factors did not enter into the final research model, even though previous research (Mohr, Holzbach, & Morrison, 1981) found that the family has a significant influence on the junior URL officer's continuance decision. It is likely in the present study that officers whose spouses did not support their naval careers had already resigned. It would then be very difficult to predict the eventual career track of officers based on differences in spousal support.

CONCLUSIONS

1. Questionnaire items did a respectable job, when considered in combination, of predicting who would obtain a proven subspecialty and who would concentrate solely on a warfare specialty.

2. Respectable predictions suggested that for some officers their career decisions were instrumental in their becoming established in the career track of their choice.

3. The fact that predictions were not more accurate might have reflected two factors:

a. A large percentage of officers with Navy-sponsored postgraduate degrees did not obtain the opportunity to apply their education in a payback tour.

b. Proven subspecialty status was primarily the result of the Navy's practice of assigning officers to two consecutive tours in the same subspecialty area, rather than officers taking responsibility for initiating and guiding their own subspecialty development.

RECOMMENDATIONS

1. To assist proactive officers who desire a proven subspecialty, the Navy should:

a. Clearly structure its subspecialty policies and paths.

b. Ensure through its policies and practices that proven subspecialty development is rewarded.

c. Communicate to officer personnel, and administer consistently, the system of subspecialty opportunities and rewards.

2. To increase the percentage of payback tours for officers with Navy-sponsored postgraduate degrees, the Navy could:

a. Utilize a larger assignment window to match personnel resources with billet vacancies.

b. Place all aspects of its subspecialty program under the same organizational structure and leadership.

c. Commit officers to specific payback tours if they have been assigned to a postgraduate degree program.

3. To enhance the Navy's development of subspecialty expertise and increase officers' involvement, the Navy should familiarize officers during their initial assignments with the subspecialty path and its requirements.

4. To aid in the development of proven subspecialists, the Navy should modify its procedures so that subspecialty career requirements are considered in the initial assignment of officers to their billets.

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*Found in Appendix C.

APPENDIX A

CRITERION/OUTCOME VARIABLE DEVELOPMENT

CRITERION/OUTCOME VARIABLE DEVELOPMENT

Conceptual Work

Criterion development was divided into two phases: conceptual and classificatory. Conceptually, the first step was to decide if more than one career track existed for the aviation warfare officer (AWO) and surface warfare officer (SWO) communities, and if such tracks existed, whether they were formal or informal. The authors decided that two formal and one informal track exist. One formal track is the traditional combat, leadership track that has individuals serving in combat-related sea billets, with successively increasing amounts of responsibilities as leaders of divisions and departments and as executive and commanding officers. A second formal track is to switch designators. Here, the individual specializes by pursuing, early in his/her career, a restricted line designator (such as intelligence, aeronautical engineering duty officer (AEDO), or engineering duty officer (EDO)), or Materiel-Professional (MP) designation as a senior officer. An informal track (referred to as the Warrior-tech Track in this research) emphasizes diversification as an unrestricted line (URL) officer, such that the individual not only acquires warrior credentials, but also attains a proven subspecialty or an equivalent Additional Qualification Designation (AQD).

The next conceptual goal in the development of the criterion was to understand the larger context in which the tracks exist; specifically, (1) the relationship they have to one another defined in terms of a continuum, (2) their connection (if any) with the career management system and senior officer manpower goals, and (3) their connection with the career development plans of the individual, both within the Navy and after.

Taking each of these conceptual issues in turn, the tracks were seen as separate points on a continuum that varies from direct full-time involvement in conducting the Navy's warfare mission (Warrior Track) to direct full-time involvement in *supporting* the warfare missions (Designator Change Track). The track reflecting both Warrior and proven subspecialty/AQD credentials was seen as the midpoint on the continuum (Warrior-tech Track). Viewed another way, individuals in the Warrior-tech Track have the credentials to switch designators to one of the MP, restricted line, or staff communities. They also have the background to remain in and pursue the Warrior Track.

In terms of career management, the Warrior-tech Track can be seen as the source of URL personnel for the MP Program. That is, selected personnel are encouraged to develop technical and managerial skills that are useful in the weapon systems acquisition management area. Viewing the tracks in terms of career development, the Warrior Track maximizes the prestige of the individual within the Navy, but prepares them least well for civilian work once they leave the Navy (major exceptions being pilots and nuclear power SWOs). In contrast, switching designators to restricted line or MP reduces the individual's prestige within the operational Navy, but prepares them well for civilian work. The Warrior-tech Track permits the individual, under favorable circumstances, to enjoy the advantages of both the other tracks, although it does not tend to develop the level of expertise present in an individual who specializes as a Warrior or who changes designators.

Classification Work

Having completed the major conceptual work involved in criterion development, the next task was to define operationally how to classify an individual into one of the career tracks. Classification

into the Warrior Track was done by process of elimination. Assignment to each of the other tracks was done as follows:

1. **Designator Change Track.** An individual was classified into this track if he/she had switched out of the SWO or AWO community and into a restricted line or staff community, such as the EDO designator or the AEDO designator. It would not include a pilot switching to naval flight officer (NFO). Also, a SWO switching to AWO, or vice versa, was not considered a change out of the Warrior Track.

2. **Warrior-tech Track.** Individuals were classified into this track if they had the proven subspecialty or AQD credentials to be considered for the MP community or one of several restricted line communities. The reasons for excluding certain restricted line communities, and all the staff communities, are discussed later.

Table A-1 presents (1) the general requirement for being assigned to the Warrior-tech Track (see the column labelled "Warrior-techs"), (2) the nonwarfare communities associated with the Warrior-tech Track ("Relevant Nonwarfare Communities"), and (3) those unassociated with the Warrior-tech Track ("Irrelevant Nonwarfare Communities"). More specifically, individuals were assigned to the Warrior-tech Track if they had the proven subspecialties or AQD credentials to be considered for: (1) the MP Program, (2) restricted line communities that are prerequisites for the MP Program ("MP forerunners"), or (3) restricted line communities unrelated to the MP Program (cryptology and intelligence).

Several other restricted line communities, and all the staff communities, were considered and rejected. Several reasons underlay this decision. Aviation Duty Officer, Public Affairs Officer, and Photographic Officer have few formal qualification requirements. Thus, it is difficult to attain credentials necessary to be considered experts in these areas. In addition, Aviation Duty Officers were considered to be Warriors with few restricted-line skills. Aviation Maintenance Duty Officer seemed inappropriate for the Warrior-tech Track, since individuals enter this community directly from the civilian sector or transfer from the aviation warfare community very early in their careers (i.e., 71% within the first 6 years) and never get to the stage of being acknowledged as Warriors. Individuals who prepare for the Medical Corps, Medical Service Corps, Dental Corps, or Judge Advocate Corps are not Warriors who are concurrently obtaining specialized skills. They are individuals who have obtained the necessary degrees to enter the Navy as medical personnel or lawyers, or who are studying to obtain these degrees while in the Navy. Chaplains represented another excluded group. If individuals are URL officers and decide to become chaplains, they must relinquish their commissions and reapply for the Chaplain Corps, as opposed to retaining their warrior status and specializing in a particular area.

Table A-2 presents the subspecialties (educational skill codes) that are preferred for entry into the MP Program or the restricted line communities relevant to the Warrior-tech Track. Individuals at times will have up to three subspecialties. The study's classification rule was that if an officer had a preferred proven subspecialty in any of the three subspecialty fields, then they were assigned to the Warrior-tech Track. In reviewing Table A-2, it may be helpful for the reader to refer to the "Note" at the bottom, which groups educational skill codes into broad content areas.

Table A-1

The Relationship Between Warrior-technicals (Warrior-techs) and Nonwarfare Communities

Warrior-techs	Relevant Nonwarfare Communities	Irrelevant Nonwarfare Communities
URL officers with prerequisites for transfer to nonwarfare communities	Materiel-Professional (MP) (12XX)	Aviation Maintenance Duty Officer (152X)
	MP Forerunners	Chaplain (4100)
	Aeronautical Engineering Duty Officer (151X)	Dental Corps (2200)
	Civil Engineering Corps (510X)	Judge Advocate Corps (250X)
	Engineering Duty Officer (14XX)	Medical Corps (2100)
	Oceanography (180X)	
	Supply Officer (310X)	Medical Service Corps (2300)
	Non-MP	
		Photography (164X)
	Cryptology (161X)	
	Intelligence (163X)	Public Affairs Officer (165X)

Table A-2

Nonwarfare Communities and Requisite Subspecialties

Nonwarfare Community	Subspecialty Educational-skill Codes[a]
Materiel-Professional (MP)	32, 39, 41, 42, 44-47, 49, 50-56, 60-63, 67-69, 70-73, 75-77, 80-82, 90, 91, 95
MP Forerunners	
Aeronautical Engineering Duty Officer (151X)	31, 32, 42, 55, 56, 71, 72, 76, 77, 81, 91, 95
Civil Engineering Corps (510X)	31, 42, 95
Engineering Duty Officer (14XX)	51, 52, 54, 55, 56, 61-63, 67, 77, 81, 91
Oceanography (180X)	47, 48, 49
Supply Officer (310X)	31, 32, 42, 95
Non-MP Communities	
Intelligence (163X)	16, 31, 76, 77, 91, 95
Cryptology (161X)	31, 42, 46, 55, 76, 77, 81, 82, 91, 95

Note. Nontechnical subspecialties not desired by nonwarfare communities: 10, 11, 12, 20-27, 30 (management-general), 33 (manpower, personnel, and training analysis), 35 (transportation management), 36 (manpower and personnel management, general), 37 (education and training management), 38 (organizational effectiveness), 40 (applied logic, general), 43 (operational logistics).

[a]Subspecialty System:

Area	Education-skill Codes	Area	Education-skill Codes
Public Affairs	10	Operations Systems Technology	43-46
English	11	Environmental Systems	47-49
History	12	Naval Systems Engineering	50-56
Intelligence	16, 17	Weapons Engineering	60-63, 67-69
Political/Military	20-27	Aeronautical Systems Engineering	70-73, 75-77
Management	30-33, 35-39	Communications	80-82
Applied Logic	40-42	Computer Technology	90, 91, 95

Table A-2 addresses the prerequisites for the MP Program first. Individuals were considered candidates for this program and were classified as Warrior-techs, if they had obtained a proven subspecialty in one of 15 areas the Navy had identified. These areas, and their educational skill codes, are financial management (31), materiel logistics support management (32), acquisition management (39), applied mathematics (41), operational analysis (42), antisubmarine warfare (44), command and control (45), electronics warfare (46), geophysics (47), oceanography (49), naval systems engineering (50-56), weapons systems engineering (60-63, 67-69), aeronautical systems engineering (70-73, 75-77), communications (80-82), and computer technology (90, 91, 95).

Some individuals did not have a proven subspecialty in antisubmarine warfare (educational skill code of 44), command and control (45), or electronics warfare (46). Nevertheless, they are considered prime candidates for the MP Program, and, thus, a member of the Warrior-tech Track if their subspecialty code has an "s" suffix for one of these educational skill (ES) areas. Unlike other ESs, an "s" suffix here means that the officer has served in two "significant experience" subspecialty coded billets. Thus, although they have not obtained a proven subspecialty, they have obtained, as far as the Navy is concerned, sufficient experience to be considered for the MP Program and they were included in the Warrior-tech Track.

There are a few subspecialties (e.g., applied logic) that do not prepare individuals for either the MP designator or any of the restricted line designators. Thus, individuals with proven subspecialties in these areas were not included in the Warrior-tech Track. They are nonetheless proven subspecialists and could not be accurately classified into the Warrior Track. Since there were so few individuals who fell into this category (N = 39), they were dropped from the study. The subspecialties alluded to here were as follows: English (an educational skill code of 11); history (12); political/military science (20-27); management, general (30); manpower, personnel, and training analysis (33); transportation management (35); manpower and personnel management, general (36); education and training management (37); organizational effectiveness (38); applied logic, general (40); and operational logistics (43).

Some individuals were initially thought to be members of the Warrior-tech Track, but then were designated as *indeterminates*. These individuals had taken the first step toward a proven subspecialty in an area that made them eligible for one of the designated restricted line communities and/or the MP Program (i.e., they had a masters or a significant experience tour).[1] However, they did not have a proven subspecialty. Thus, it did not seem appropriate to classify such individuals into the Warrior-tech Track at this time. However, since these individuals might still attain a proven subspecialty, it was also decided that it would be premature to classify them as Warriors. They were thus designated as "indeterminates" and eliminated from the analyses.

Having dealt with all the issues related to subspecialties and classification into the Warrior-tech Track, the researchers turned their attention to the issue of AQDs. Additional classification rules were formulated; for example, if officers had acquired an AQD of WW2, indicating proven experience in weapon systems acquisition management, they were classified into the Warrior-tech

[1]This group of individuals had a functional code (first two digits of the 5-character subspecialty code), which according to Navy manuals, indicates application of their significant experience or education in a second billet. However, the detailers (NMPC) revealed that the functional codes basically meaningless.

Track. Further, individuals were classified into this track if they had obtained AQDs indicating they were anti-air warfare (AAW)-qualified (an AQD of BF1) or electronics warfare (EW)-qualified (BK1). Both BF1 and BK1 indicate that the individuals are "technical experts" according to the Navy's standards.

APPENDIX B

FORMATION OF THE SAMPLE

FORMATION OF THE SAMPLE

The original research design included an attempt to predict who would switch designators between FY82 (Time1 (T1)) and FY87 (Time2 (T2)), together with an attempt to predict who would obtain a proven subspecialty by T2 and who would remain totally committed to a warfare specialty career track. Because of personnel and time constraints, a decision had to be made about which aspect of the study to pursue. Since the number of personnel attaining proven subspecialty status exceeds the number switching designators, predictions concentrated on the former.

The strategy in forming the sample was to select commissioning year groups between 1961 and 1980, such that the percentage of officers at T1 who had combination (Warrior-tech) Track credentials was minimal, *and* the percentage of individuals at T2 who had Warrior-tech Track credentials was maximal. On one hand, it was pointless to identify individuals who were in the Warrior-tech Track at T1 and use this status as a predictor of career track membership at T2. It would have been equally pointless to select commissioning year groups that had not had enough time to obtain the credentials for Warrior-tech status by T2.

To identify the relevant commissioning years, curves were generated that plotted the proportion of Warrior-techs by commissioning year. Separate T1 and T2 curves were constructed for surface warfare officers (SWOs) and aviation warfare officers (AWOs) (see Figures B-1 and B-2). The proportions of Warrior-techs used to construct the two figures are presented in Tables B-1 and B-2, together with the number of officers comprising each commissioning year group.

Figures B-1 and B-2 were examined to determine where the greatest difference in T1 and T2 percentages lay and what commissioning years they represented. To identify the commissioning years, the T1 and T2 curves were examined (starting with 1961) to determine where they diverged appreciably, the range of years for which this divergence persisted, and the point at which the curves started to converge. For SWOs, commissioning years 1969 through 1975 were identified, and for AWOs, 1972 through 1976. It was decided to use commissioning years 1969 through 1976 for both groups (N = 1,786), since an intercommunity comparison of results was planned. Curves generated for AWOs and SWOs combined (not shown) empirically supported this decision (i.e., differences between the heights of the curves were large enough to justify selection of commissioning years 1969 through 1976).

Having identified the relevant commissioning years, they were purged of individuals who were Warrior-techs at T1 (N = 164) and of individuals who were proven subspecialists at T2 but not in the areas that prepared them for the restricted line, staff, or MP communities (N = 39). Five of these types of proven subspecialists were also found at T1 and eliminated. Commissioning years 1969 through 1976 were also purged of T2 indeterminates (N = 249). (T1 indeterminates were not purged, because their status could be used as predictors of Warrior-tech status at T2.) The total number of purged individuals was 457. Subtracting this total from the 1,786 officers comprising commissioning years 1969 through 1976 left a final sample of 1,329 officers for analysis.

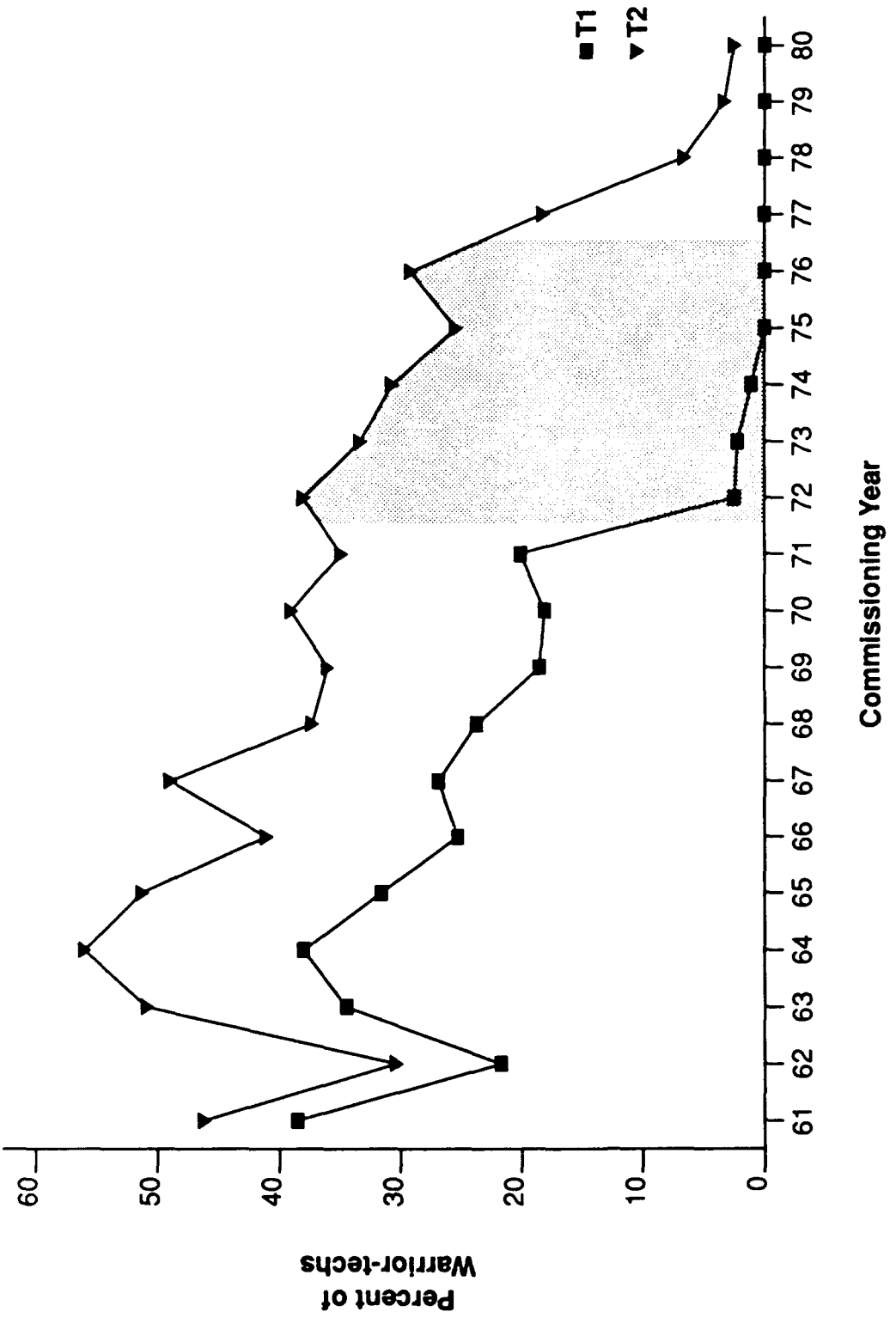

Figure B-1. Percentage of Aviator Warrior-techs by commissioning year.

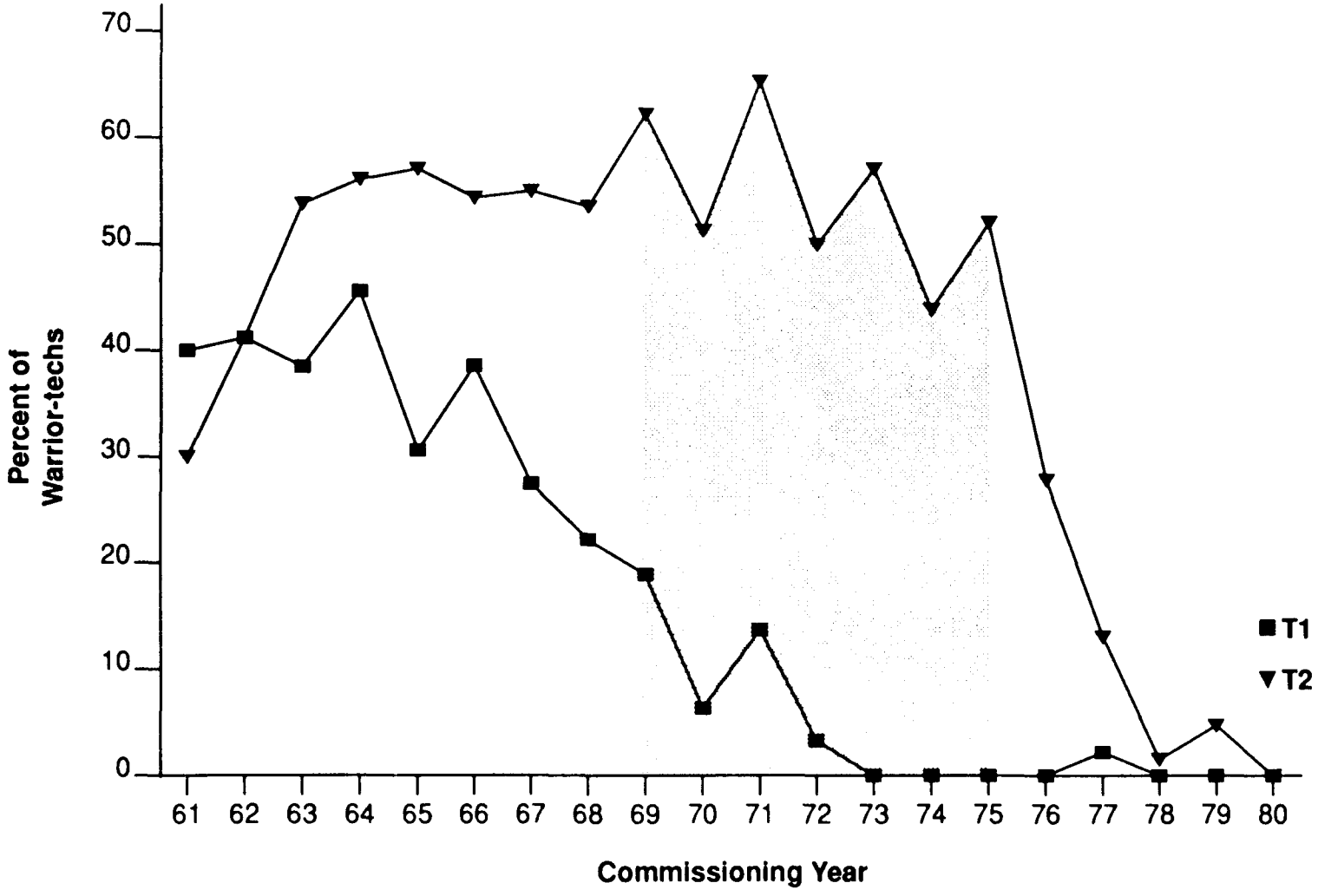

Figure B-2. Percentage of Surface Warfare Officer Warrior-techs by commissioning year.

Table B-1

Aviation Warfare Officers: Proportion of Warrior-techs (W-T) by Commissioning Year (ComYr)

ComYr	ComYr N	T1 % of W-T	T2 % of W-T	% Difference
1961	13	38.5	46.2	7.7
1962	23	21.7	30.4	8.7
1963	55	34.5	50.9	16.4
1964	50	38.0	56.0	18.0
1965	76	31.6	51.3	19.7
1966	95	25.3	41.1	15.8
1967	145	26.9	49.0	22.1
1968	177	23.7	37.3	13.6
1969	211	18.5	36.0	17.5
1970	182	18.1	39.0	20.9
1971	149	20.1	34.9	14.8
1972	158	2.5	38.0	35.5
1973	183	2.2	33.3	31.1
1974	189	1.1	30.7	29.6
1975	126	0.0	25.4	25.4
1976	110	0.0	29.1	29.1
1977	137	0.0	18.2	18.2
1978	121	0.0	6.6	6.6
1979	120	0.0	3.3	3.3
1980	122	0.0	2.5	2.5
Total	2,442			

Note. Commissioning years 1972 through 1976 were selected in the research as those years for which the criterion groups (Warrior vs. Warrior-tech) should be formed.

Table B-2

Surface Warfare Officers: Proportion of Warrior-techs (W-T) by Commissioning Year (ComYr)

ComYr	ComYr N	T1 % of W-T	T2 % of W-T	% Difference
1961	20	40.0	30.0	-10.0
1962	34	41.2	41.2	0.0
1963	39	38.5	53.8	15.3
1964	57	45.6	56.1	10.5
1965	49	30.6	57.1	26.5
1966	57	38.6	54.4	15.8
1967	80	27.5	55.0	17.5
1968	99	22.2	53.5	31.3
1969	74	18.9	62.2	44.7
1970	80	6.3	51.3	45.0
1971	95	13.7	65.3	51.6
1972	90	3.3	50.0	46.7
1973	56	0.0	57.1	57.1
1974	41	0.0	43.9	43.9
1975	50	0.0	52.0	52.0
1976	54	0.0	27.8	27.8
1977	46	2.2	13.0	10.8
1978	66	0.0	1.5	1.5
1979	43	0.0	4.7	4.7
1980	29	0.0	0.0	0.0
Total	1,159			

Note. Commissioning years 1969 through 1975 were selected in the research as being the most appropriate for classifying individuals into the criterion groups (Warrior vs. Warrior-tech).

Table B-3 presents the numbers of individuals in each career track at T2 (see "Criterion Categories"), the subgroups of individuals contributing to these tracks, and "purged" individuals ("Noncriterion Categories") (i.e., the original 1,786 individuals commissioned between 1969 and 1976).

The breakdown of the final sample of 1,329 officers by grade at T1 was 37.7 percent LTs, 62.1 percent LCDRs, and .2 percent CDRs. Corresponding results at T2 were 70.8 percent LCDRs and 29.2 percent CDRs. There were 377 SWOs (28.4%) and 952 AWOs (71.6%). The breakdown by commissioning year was as follows: 207 (1969), 211 (1970), 189 (1971), 235 (1972), 226 (1973), 221 (1974), 173 (1975), and 155 (1976).

Table B-3

Breakdown of Time2 Sample into Criterion and Noncriterion Categories (N = 1,786)

Category	Sample Size
Criterion Categories	1329
Warrior Track	681
Warrior-tech Track	648
Subspecialty-determined	647
Additional Qualification Designations (AQDs) (WW2, BF1, BK1)[a]	1
Noncriterion Categories (purged from T2 sample)	457
Indeterminates	249
Subspecialty experts in areas unrelated to restricted line communities	
AT Time1	5
At Time2	39
Officers qualifying as Warrior-techs at T1	164

Note. The 1,786 officers summarized in the chart include commissioning years 1969 through 1976.

[a]Some individuals were classified into the Warrior-tech Track based on their receiving certain AQDs. The rationale behind this classification is provided in Appendix A.

APPENDIX C

HIERARCHICAL INCLUSION MULTIPLE REGRESSION RESULTS

HIERARCHICAL INCLUSION MULTIPLE REGRESSION RESULTS

ANALYSIS OF THE DATA: A TECHNICAL TREATMENT

Approach

The primary analytical procedure used in this research was hierarchical inclusion multiple regression (SPSSX Inc., 1988) with moderator variables (Stone & Hollenbeck, 1989). Effects-coding (Pedhazur, 1982) was used to represent nominal variables. The significance levels used were $p < .05$ for smaller samples and $p < .01$ for larger samples.

Career Track Status Regressed on Predictors

Career Decisions

Using the hypothesized model depicted in Figure 2 as a reference, the criterion (W/WT) was regressed on the decision to obtain a postgraduate degree (POSTGRAD). The decision to obtain a postgraduate degree was then regressed on the decision to obtain a proven subspecialty (SUBSP). Both multiple correlations were statistically significant ($R = .21$; F (df = 1, 1276) = 60.2; $p = .00$) and ($R = .32$; F (df = 1, 1255) = 145.3; $p = .00$), respectively, supporting Hypotheses 1a and 1b. More officers who had obtained proven subspecialties had decided to obtain postgraduate degrees (Hypothesis 1a), and the decision to obtain proven subspecialties was related to the decision to obtain a postgraduate degree (Hypothesis 1b).

However, these results were disappointingly small. Since a detailed description of the sample found that many more officers received experience-based than education-based proven subspecialties, it was decided to conduct exploratory analyses. First, the criterion was regressed on both decisions (POSTGRAD and SUBSP). The result was a significantly greater multiple correlation ($R = .31$; F (df = 2, 1254) = 68.8; $p = .00$).

Organizational Mission

Because experience-based proven subspecialties were heavily dependent on the organizational mission/job assignment combination, the nominal variable, organizational mission, was added to the prediction side of the equation. The R increased significantly to .49 (F (df = 5, 1251) = 78.7; $p = .00$). The addition of the terms for the interactions between the nominal variable codes and the decisions did not increase the R-square significantly ($F = 1.4$; $p = .21$), indicating that organizational mission did not moderate the decisions. Since the B weights for all of the nominal variables were significant, the resulting equations differed in their intercepts as expected when the groups were established:

SWO:	W/WT =	1.16	+	.05	POSTGRAD	+ .09	SUBSP
TACPLUS:	W/WT =	1.25	+	.05	POSTGRAD	+ .09	SUBSP
ASW/EW:	W/WT =	.84	+	.05	POSTGRAD	+ .09	SUBSP
VP:	W/WT =	1.26	+	.05	POSTGRAD	+ .09	SUBSP.

Thus, while the proportion of Ws vs. WTs varies significantly across originational missions, the decision-criterion relationships are similar for all four groups in contrast to what was *hypothesized* (Hypothesis 1ai). The model was revised to include both decisions and organizational mission as predictors of the criterion, W/WT, because of the major increase in criterion variance accounted for.

Postgraduate Degree Decision Regressed on Predictors

To continue the development of the path model, the regression of the postgraduate school decision on the proven subspecialty decision was expanded to include nominally-scaled variables for the three *occupation groups*. The multiple correlation increased significantly to .42 (F (df = 3, 1074) = 77.6, $p = .00$). In the next step, the interaction terms representing the occupational groups and the *subspecialty decision* were added to the prediction side of the equation. There was no significant increase in R-square ($\Delta R^2 = .00$, $F = .92$, $p = .40$). In Step 4, the three measures of *instrumentality* were added to the regression equation. The increase in R-square was not significant ($\Delta R^2 = .01$; $F = 2.3$, $p = .08$). In Step 5, the six interaction terms representing the occupational groups and the three instrumentalities were added to the regression equation. There was no significant increase in R-square ($\Delta R^2 = .00$, $F = 1.00$, $p = .42$). In Step 6, the 15 variables representing the *family, career decision process, career attitude*, and *change constructs* were added to the prediction equation. The resulting change in R-square was significant ($\Delta R^2 = .02$, $F = 1.98$, $p = .01$). The addition of the interaction terms and *background* factors did not add anything significant to the ability to predict the decision to obtain a postgraduate degree ($\Delta R^2 = .00$, $F = .97$, $p = .42$).

The final equation, resulting from the Step 6 analysis, was composed of seven (of the 15) variables with B weights significant at the $p = .05$ level or better and $R = .44$ (F (df = 8, 1069) = 32.8, $p = .00$. Since two of the variables represented nominal variables for occupation, the following three separate equations were formed:

SWOs: POSTGRAD = 1.62 + .31 SUBSP + .03 POSTNAVY + .06 HDQTRS - .03 PUBLC -.05 ASSIGN, where POSTNAVY = contribution to a post-naval career; HDQTRS and PUBLC = using headquarters and public sources, respectively, for career information; and ASSIGN = felt past assignments were based on experience/ performance.

NFOs: POSTGRAD = 1.43 + .31 SUBSP + .03 POSTNAVY + .06 HDQTRS - .03 PUBLC - .05 ASSIGN

Pilots: POSTGRAD = 1.62 + .31 SUBSP + .06 HDQTRS - .03 PUBLC - .05 ASSIGN.

The major predictor of the postgraduate degree decision was the decision to obtain a proven subspecialty. The only difference between the SWOs and NFOs was in the intercept (constant) with the slopes of the regression equations being alike. Pilots differed from the other two occupations because, as hypothesized (Hypothesis 1bi), they did not consider the impact of a postgraduate degree on their post-naval careers.

Marital Status and Family Factors

The next series of steps used to develop the path predicting the postgraduate decision within the model required the addition of the third nominal variable, marital status. The inclusion of marital status as either a predictor of the decision to obtain a postgraduate degree or a moderator of the relationship between the two decisions did not increase the R-square significantly ($F = .01$; $p = .94$) and ($F = 2.25$, $p = .13$), respectively. Marital status was also not a moderator of the relationships between the three instrumentalities and the decision to obtain a postgraduate degree ($\Delta R^2 = .00$, $F = .18$; $p = .91$). When the four variables comprising the family factor were included in the prediction of the postgraduate degree decision for married officers, no B weight was significantly different from zero at $p < .05$. Thus, the results concerning marital status and the family were consistent. In contrast to Hypothesis 2d, married officers' decisions about obtaining a postgraduate degree were influenced by the same factors that influenced single officers' decisions.

Proven Subspecialty Decision Regressed on Predictors

To develop the path predicting the subspecialty decision within the model, the same series of analyses were conducted using the decision to obtain a proven subspecialty as the dependent variable. When the three *occupational groups*, SWO, NFO, and pilot, were used to predict the subspecialty decision, the resulting relationship was significant ($R = .21$, F (df = 2, 1101) = 24.4, $p = .00$). The addition of the three *instrumentality* measures increased R-square significantly ($\Delta R^2 = .24$, $F = 120.0$, $p = .00$). With the addition of the terms representing the products of the nominal variables for the three occupational groups and the three instrumentalities, R-square increased significantly ($\Delta R^2 = .01$, $F = 2.9$, $p = .01$). In Step 4, the block of 15 variables representing *family, career decision process, career attitude,* and *change* were included in the equation. Again, R-square increased significantly ($\Delta R^2 = .02$, $F = 1.7$, $p = .04$). Neither Step 5 (30 interaction terms formed by the occupational variables in combination with the 15 variables in Step 4), nor Step 6 (two *background* variables), nor Step 7 (four occupational X background interaction terms) provided any significant increase in the variance accounted for.

The final equation resulting from the Step 4 analysis was composed of five (of the 15) variables with B weights significant at the .05 level or better and $R = .51$ (F (df = 7, 1269) = 62.55, $p = .00$). Since one variable represented an interaction of the nominal variable for pilots, the following two separate equations were formed:

SWOs/NFOs: SUBSP = .78 + .21 NAVY + .05 POSTNAVY + .05 GEOCH - .03 JOBCH, where NAVY = contribution to a naval career, and GEOCH and JOBCH = satisfaction with geographic moves and job changes, respectively.

Pilots: SUBSP = .78 + .19 NAVY + .05 POSTNAVY + .05 GEOCH - .03 JOBCH.

The only difference among the occupational groups was a somewhat greater feeling by the SWOs and NFOs that a proven subspecialty would aid their careers in the Navy.

As a result of the analyses, the following hypotheses about the perceptions of those officers who had decided to obtain a proven subspecialty were supported: (1) proven subspecialties would

help their naval careers (Hypothesis 2a), (2) proven subspecialties would help their *post-naval* careers (Hypothesis 2b), and (3) frequent geographic relocations were more acceptable (Hypothesis 6b).

In contrast to hypothesis 6a, officers who decided to obtain a proven subspecialty reported less positive attitudes toward frequent job changes than those who decided not to do so.

No hypotheses regarding career attitudes (5a and 5b), career decision processes (4a through 4f) or background (7a and 7b) were supported. The hypothesis (2c) that those choosing to obtain a proven subspecialty would base the decision partially on a postgraduate degree aiding them in promotions also was not supported.

Marital Status and Family Factors

The final series of analyses used to develop the path predicting the subspecialty decision in the model involved marital status and family factors. When marital status was considered as either a predictor of the decision to obtain a proven subspecialty or a moderator of the relationship between the decision and either of the three instrumentalities, there was no significant contribution to R-square ($\Delta R^2 = .00$; $F\ (df = 1, 1291) = .75$; $p = .39$) and ($\Delta R^2 = .00$, $F = 1.6$; $p = .18$), respectively. When the four variables representing the family factors were included in the prediction of the subspecialty decision for married officers, no B weight was significantly different from zero at $p < .05$. The results for marital status and family factors were thus consistent. Married officers' decisions about obtaining a proven subspecialty were based on the same considerations used by single officers. In contrast to the hypotheses (3a, 3b, and 3c), the support of their spouses, family stability, family separation, and spouses' occupations did not influence the officers' decisions about obtaining a proven subspecialty.

Using the results of these analyses, Figure 2 was revised as shown in Figure C-1. It should be noted that the model generalizes across marital status and occupation except for the two career instrumentality paths to each decision for pilots. The statistical power of all of the analyses, using an alpha level of .01, was .99 or better (Cohen, 1977).

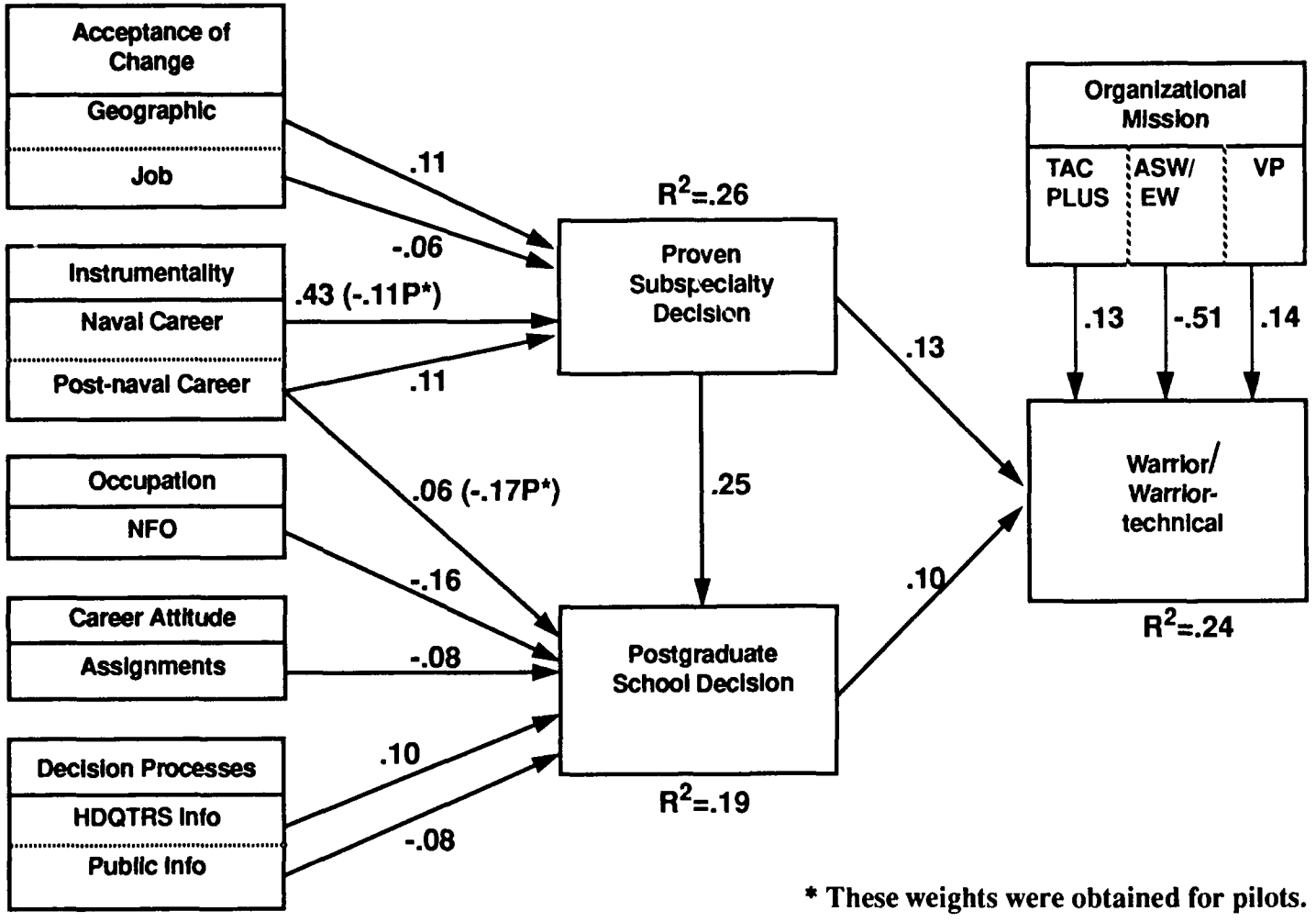

Figure C-1. Revised model of factors predicting Warrior and Warrior-technical career tracks.

APPENDIX D

REGRESSION RESULTS WITH A NEW CRITERION (OUTCOME) VARIABLE

REGRESSION RESULTS WITH A NEW CRITERION (OUTCOME) VARIABLE

Since predictions in the present study were predicated on the debatable assumption that officers controlled their own fates, a new outcome measure was constructed. This measure took into consideration the degree to which officers were assumed to have taken responsibility for developing their own careers. Specifically, proven subspecialists who had attended postgraduate school were assumed to have exercised the most control over developing their careers, since postgraduate school attendance requires the individual's initiative. In contrast, it was assumed that most Warriors were following the mainstream norm without much active consideration for an alternative naval career. The group that had obtained proven subspecialty status through experience tours was assumed to be composed of some individuals who took the initiative and some who had been unaware of and/or passively accepted what the Navy had given them. In short, this group was perceived to be somewhere between the other two groups on the issue of volition.

This new variable was a trichotomy, with Warriors coded as 1, Warrior-techs with experience tours as 2, and Warrior-techs with postgraduate degrees as 3. The original outcome variable coded Warriors as 1 and Warrior-techs as 2. Random selection by commissioning years was used to produce samples from the Warrior and experience-based Warrior-tech groups that matched the education-based Warrior-tech group in size. In the analyses, the two criteria were regressed on all predictors in the model.

As shown in Table D-1, the new outcome measure, as expected, produced a higher multiple R (.48) than did the old outcome measure (.36), a difference that was significant at the .001 level. Only those variables that were significant predictors for one criterion or the other are included in the table.

Table D-1

Bivariate and Trivariate Criterion Comparison

Predictor	Criterion[a] W/WT	Criterion[a] W/EXWT/EDWT
POSTGRAD	.13 (.00)	.16 (.00)
SUBSP	.20 (.00)	.26 (.00)
POSTNAVY	.08 (.01)	.09 (.06)
GEOCH	.08 (.01)	.10 (.05)
JOBCH	-.09 (.00)	- - - -
PEER	- - - -	.11 (.03)
CMD	-.09 (.00)	-.13 (.01)
ASSIGN	.08 (.00)	.12 (.01)
TECH	- - - -	-.09 (.05)
RESRV	-.06 (.03)	- - - -
N	1,200	408
R	.36	.48

Note. - - - - = this predictor yielded an insignificant beta weight.
W/WT = Warrior/Warrior-tech
EXWT = Warrior-techs with experience tours
EDWT = Warrior-techs with postgraduate degrees
POSTGRAD = decision to obtain a postgraduate degree
SUBSP = decision to obtain a proven subspecialty
POSTNAVY = contribution to a post-naval career
GEOCH = satisfaction with geographic moves
JOBCH = satisfaction with job changes
PEER = using peer sources for career information
CMD = using the commanding officer as a career information source
ASSIGN = felt past assignments were based on experience and performance
TECH = technical bachelor's degree
RESRV = commissioned as a reserve officer.

[a]Beta weights and significance levels.

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